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ROTIFERA FROM THE ADIRONDACK REGION OF NEW YORK

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All of the lakes of the southern slope of the Adirondacks are physiographically similar, being of glacial origin and surrounded by hills composed of crystalline rock formations. The biophysical features are virtually the same, and the rotatorian fauna of any one of them is representative of them all.

During a period of several years, numerous collections were made in the following lakes: Caroga Lake, Peck Lake, Van Denburg Pond, Canada Lake, Pine Lake, Stoner Lake, Pleasant Lake, Sacandaga Lake and Piseco Lake.

As Caroga Lake was the easiest of access, by far the greatest number of collections were made there, and it may be considered the type lake of the series examined.

Caroga Lake, situated about twelve miles northwest of Gloversville, New York, is about three miles in length and one-half mile in width, at the widest part. It is one among the numerous lakes of glacial origin lying on the southern slope of the Adirondack Mountains, all of which are surrounded by rugged, stony shores and the waters are acid, ranging in p_H from 6.4 to 7.0.

As is the case in this type of lake, submerged aquatic vegetation is relatively sparse, and is only to be found in abundance in the shallower, protected areas.

The water level of Caroga Lake is maintained by a low dam at the outlet. Between this and where the embankment of state automobile route 10 crosses the southern portion, there is a small, calm area that is protected from wind action and, therefore, from waves of any appreciable size. The water is only several feet deep outside of the narrow channel, and the bottom is carpeted with a vigorous growth of *Sphagnum*, *Nitella* and *Utricularia*. It was here that most of the collections were made.

I am much indebted to Dr. Raymond C. Petrie of Johnstown, for his kind assistance in collecting, and transportation to and from the various lakes, together with extending the facilities of his laboratory which he placed at my disposal.

The following new species are described in his paper:

<i>Notommata parvida</i>	<i>Cephalodella celeris</i>
<i>Notommata stitista</i>	<i>Eothinia carogaensis</i>
<i>Monommata viridis</i>	<i>Dicranophorus minutes</i>
. <i>Trichocerca rotundata</i>	

Monommata aequalis (Ehreuberg) is re-described and figured.

FAUNAL LIST

The symbols after specific names have the following significance: a, abundant (common at all times); c, common (numerous occasionally); f, few (several here and there); r, less than five; * acid water species.

Adineta vaga (Davis), f
Ascomorpha eucadis Perty, c
Ascomorpha saltans Bartsch, c
Aspella aper Harring, f
Aspella beltista Harring and Myers, f, *
Aspella circinator (Gosse), f
Asplanchna priodonta Gosse, c, limnetic
Asplanchna herrickii de Guerne, c, limnetic
Asplanchnopus dahlgreni Myers, r, *
Asplanchnopus multiceps (Schränk), f
Cephalodella auriculata (Müller), a
Cephalodella celeris new species, f, *
Cephalodella elongata Myers, c, *
Cephalodella eva (Gosse), c
Cephalodella exigua (Gosse), c
Cephalodella forficata (Ehrenberg), f
Cephalodella forficula (Ehrenberg), f
Cephalodella gibba (Ehrenberg), a
Cephalodella gracilis (Ehrenberg), c
Cephalodella hyalina Myers, r, *
Cephalodella intuta Myers, c
Cephalodella inquilina Myers, c, *
Cephalodella megalocéphala Glasscott, c
Cephalodella mira Myers, r, *
Cephalodella mucronata Myers, c, *
Cephalodella physalis Myers, f
Cephalodella tantilla Myers, c
Cephalodella tenuior (Gosse), c
Chromogaster ovalis (Bergendal), c
Colurella bicuspidata (Ehrenberg), c
Colurella obtusa (Gosse), a
Colurella sulcata (Stenroos), f
Colurella tessellata (Glasscott), f
Conochilus hippocrepis (Schränk), c
Conochilus unicornis Rousselet, f

- Cyrtonia tuba* (Ehrenberg), f
Dapidia calpidia Myers, c, *
Dicranophorus artamus Harring and Myers, c, *
Dicranophorus alcinus Harring and Myers, r, *
Dicranophorus capucinus Harring and Myers, f
Dicranophorus cernuus Harring and Myers, r, *
Dicranophorus edestes Harring and Myers, f
Dicranophorus epicharis Harring and Myers, c
Dicranophorus hercules Wiszniewski. Piseco Lake, (hygrosummon)
Dicranophorus isotherus Harring and Myers, f, *
Dicranophorus lütkeni (Bergendal), c
Dicranophorus mesotis Harring and Myers, c, *
Dicranophorus minutes, new species, f, *
Dicranophorus proclastes Harring and Myers, f, *
Dicranophorus rostratus (Dixon-Nuttall and Freeman), c
Dicranophorus rostratus corystis Harring and Myers, c
Dicranophorus robustus Harring and Myers, c
Dicranophorus thysanus Harring and Myers, r, *
Dicranophorus uncinatus (Milne). Piseco Lake, r, *
Dissotrocha aculeata (Ehrenberg), c
Dissotrocha macrostyla (Ehrenberg), c
Dorystoma caudata (Bilfinger), f
Dorria dalicarllica Myers. Stoner Lake. Rock moss, near outlet
Encentrum felis (Müller), c
Eothinia argus Harring and Myers, f, *
Eothinia carogaensis, new species, f, *
Eothinia elongata (Ehrenberg), f
Eothinia tryphaea Harring and Myers, f, *
Erignatha clastopis (Gosse), c
Euchlanis alata Voronkov, r
Euchlanis callista Myers, r, *
Euchlanis dilatata Ehrenberg, a
Euchlanis meneta Myers, c
Euchlanis parva Rousselet, c
Euchlanis pellucida Harring, c
Euchlanis triquetra Ehrenberg, c
Floscularia janus (Hudson), c
Floscularia ringens (Linnaeus), c
Gastropus minor (Rousselet), c
Habrotrocha munda (Bryce), f
Keratella cochlearis (Gosse), a
Keratella quadrata (Müller), f
Keratella serrulata (Ehrenberg), f
Lecane acronycha Harring and Myers, f, *
Lecane acus (Harring),¹ f

¹ On account of the growing number of transitions between the genera *Lecane* and *Monostyla*, exhibited in a continually growing number of species, Edmondson (1935) proposed a union of the two genera into the genus *Lecane*. In the same paper he also proposed a union of the genera *Trichocerca* and *Diurella* for obvious reasons. The above unions have been adhered to in this paper.

- Lecane brachydactyla* (Stenroos), f, *
Lecane aquila Harring and Myers, f
Lecane arcula Harring, f
Lecane bulla (Gosse), c
Lecane bulla stygax (Harring and Myers), c
Lecane clara Bryce, c
Lecane closterocerca (Schmarda), c
Lecane cornuta (Müller), f
Lecane crenata (Harring), f
Lecane depressa (Bryce), f
Lecane elachis (Harring and Myers), f
Lecane elasma Harring, f
Lecane flexilis (Gosse), c
Lecane furcata (Murray), f
Lecane hamata (Stokes), c
Lecane inermis (Bryce), c
Lecane infula (Harring and Myers), f
Lecane inquieta Myers. Piseco Lake, (hygropsammon)
Lecane intrasinuata (Olofsson), c
Lecane ligona (Dunlop), f, *
Lecane ludwigii (Eckstein), f
Lecane luna (Müller), f
Lecane lunaris (Ehrenberg), a
Lecane methoria Harring and Myers, f
Lecane mira (Murray), c
Lecane nana (Murray), f
Lecane pertica Harring and Myers, c, *
Lecane ploensensis (Voight), f
Lecane pygmaea (Daday), f
Lecane pyrrha Harring and Myers, f, *
Lecane quadridentata (Ehrenberg), c
Lecane satyrus Harring and Myers, r, *
Lecane signifera (Jennings), f
Lecane stichaea Harring, c
Lecane subulata (Harring and Myers), f
Lecane tenuiseta Harring, f
Lepadella acuminata (Ehrenberg), f
Lepadella cristata (Rousselet), c
Lepadella ovalis (Müller), c
Lepadella patella (Müller), a
Lepadella quinquecostata (Lucks), f
Lepadella triptera (Ehrenberg), c
Lepadella venefica Myers, c
Lindia pallida Harring and Myers, c
Macrochaetus collinsii (Gosse), c
Mikrocodides chlaena (Gosse), c
Mytillina ventralis (Ehrenberg), r
Monommata aequalis (Ehrenberg), c

- Monommata astia* Myers, c
Monommata diaphora Myers, f
Monommata grandis Tessin, c
Monommata longiseta (Müller), a
Monommata maculata Harring and Myers, c
Monommata viridis, new species, c, *
Notholca bostoniensis Rousselet, f
Notholca longispina (Kellicott), c, limnetic
Notommata contorta (Stokes), f
Notommata copeus Ehrenberg, f
Notommata cyrtopus Gosse, c
Notommata doneta Harring and Myers, f, *
Notommata fasciola Myers, r, *
Notommata pachyura Gosse, f
Notommata parvida, new species, c
Notommata peridia Harring and Myers, f, *
Notommata saccigera Ehrenberg, c, *
Notommata silpha (Gosse), c
Notommata stitista, new species, f, *
Notommata thopica Harring and Myers, c
Notommata tripus (Ehrenberg), f
Platylabus quadracornis (Ehrenberg), r
Pleurotrocha petromyzon (Ehrenberg), c
Pleurotrocha robusta (Glasscott), f
Pleurotrocha thrua Myers, c, *
Ploesoma formosum Myers, f, *
Ploesoma lenticulare (Herrick), c
Ploesoma triacanthum (Bergendal), c
Ploesoma truncatum (Levander), c
Polyarthra trigla (Ehrenberg), a
Proales decipiens (Ehrenberg), a
Proales doliaris (Rousselet), c
Proales granulatus Myers, f, *
Proales sordida Gosse, c
Proalinopsis gracilis Myers, f
Proalinopsis squamipes Hauer. Stoner Lake, Rock moss near outlet
Pseudoecistes rotifer Stenroos, f
Reticula melandocus (Gosse), f
Rotaria macrura (Ehrenberg), f
Rotaria rotatoria (Pallas), a
Rotaria sordida (Western), c
Rotaria tardigrada (Ehrenberg), f
Rousseletia corniculata Harring, c
Scaridium longicaudum (Müller), c
Squatinella longispinata (Tatem), f
Squatinella mutica (Ehrenberg), f
Squatinella stylata (Milne), r
Stephanoceros millsii (Kellicott), f

- Stephanoceros fimbriatus* (Goldfuss), r
Streptognatha lepta Harring and Myers, f, *
Synchaeta pectinata Ehrenberg, c
Synchaeta stylata Wierzejski, f
Taphrocampa annulosa Gosse, a
Taphrocampa selenura Gosse, f
Testudinella angulata Myers, c, *
Testudinella dicella Myers, f, *
Testudinella incisa (Ternetz), c
Testudinella parva (Ternetz), c
Testudinella parva bidentata (Ternetz), c
Testudinella patina (Hermann), f
Tetrasiphon hydrocora Ehrenberg, f
Trichocerca bicristata (Gosse), f
Trichocerca brachyura (Gosse), c
Trichocerca cavia (Gosse), a
Trichocerca collaris (Rousselet), a
Trichocerca cylindrica (Imhof), c, limnetic
Trichocerca elongata (Gosse), r
Trichocerca iernis (Gosse), c
Trichocerca lata (Jennings), f
Trichocerca longiseta (Schrank), a
Trichocerca mucosa (Stokes), f
Trichocerca ornata Myers, c, *
Trichocerca platessa Myers, c, *
Trichocerca porcellus (Gosse), c
Trichocerca rattus (Ehrenberg), c
Trichocerca rosea (Stenroos), a
Trichocerca rotundata, new species, c, *
Trichocerca scipio (Gosse), a
Trichocerca similis Wierzejski, f
Trichocerca sulcata (Jennings), c
Trichocerca tenuior (Gosse), c
Trichocerca tigris (Müller), a
Trichocerca tortuosa Myers, c
Trichotria tetractis (Ehrenberg), a
Trichocerca tetractis caudata (Lucks), c

ORDER MONOGONONTA

Family Notommatidae

Subfamily Notommatinae

Notommata parvida, new species

Figures 1, 4, 7

The body is slender, its greatest width being about one-fourth of the total length. The integument is quite flexible, but the outline is very constant.

There is a transverse skin fold between the head and neck, also one between the

neck and the abdomen. On the dorsal side of the posterior third of the abdomen are two prominent "bosses," one on each side of the median line. The tail is round and has a distinct median notch. The foot has two short joints. The toes are nearly parallel-sided; the base is somewhat enlarged and they are reduced abruptly near the ends, terminating in papillose tips.

The corona extends down on the ventral side about one-fourth the length of the body, and the post-oral portion forms a small chin. The auricles are rather small and are provided with long tufts of locomotor cilia.

The dorsal, lateral and caudal antennae are minute setigerous pits in the normal positions.

The mastax is of normal virgate type. The fulcrum is straight, and tapers toward the posterior end which is enlarged for the attachment of the hyperpharynx. The nearly symmetrical rami appear triangular in ventral view, and the anterior halves are bent at a right angle. Just beyond the anterior angle, the dorsal portion of the right ramus is finely denticulate; the opposing margin of the left ramus is also denticulate, but the teeth are much stouter and more widely spaced than those of the right ramus. The unci are identical in denticulation, each having a robust preuncial tooth followed, in turn, by one stout and two somewhat smaller teeth, and a divergent, linear strengthening rib. An extremely thin lamellar plate unites all of these. The manubria are very stout and have a broad central branch and a lamellar, sub-square anterior portion, the depth of which is about one-half of the length of the entire manubrium. A pair of curved rods, attached by their ventral ends to the inner surface of the rami, pass under the manubria and terminate below the dorsal tips of the rami.

The oesophagus is long and slender. The stomach and intestine are not very distinctly separated. The gastric glands are oval and of normal size. The ovary is relatively small and somewhat elongate transversally to the body axis. The bladder is quite small. There are four foot glands, one pair being fairly large, while the other pair are very small.

The retrocerebral sac is large and clear; the subcerebral glands are a little over one-half the length of the sac. The lenticular eyespot is situated at the posterior end of the ganglion.

Total length, 375 μ ; toes, 22 μ .

Notommata parvida was quite common. It is not uncommon in acid water associations in Atlantic County, New Jersey. It is closely related to *Notommata cerberus* (Gosse), from which it differs in the characteristic shape of the toes, the elements of the trophi and by the presence of the lateral "bosses" on the postero-dorsal portion of the abdomen.

Paratype: Cat. No. 877, A. M. N. Hist.

***Notommata stitista*, new species**

Figures 2, 5, 8

The body is short and stout. The integument is transparent and the outline of the body is very constant.

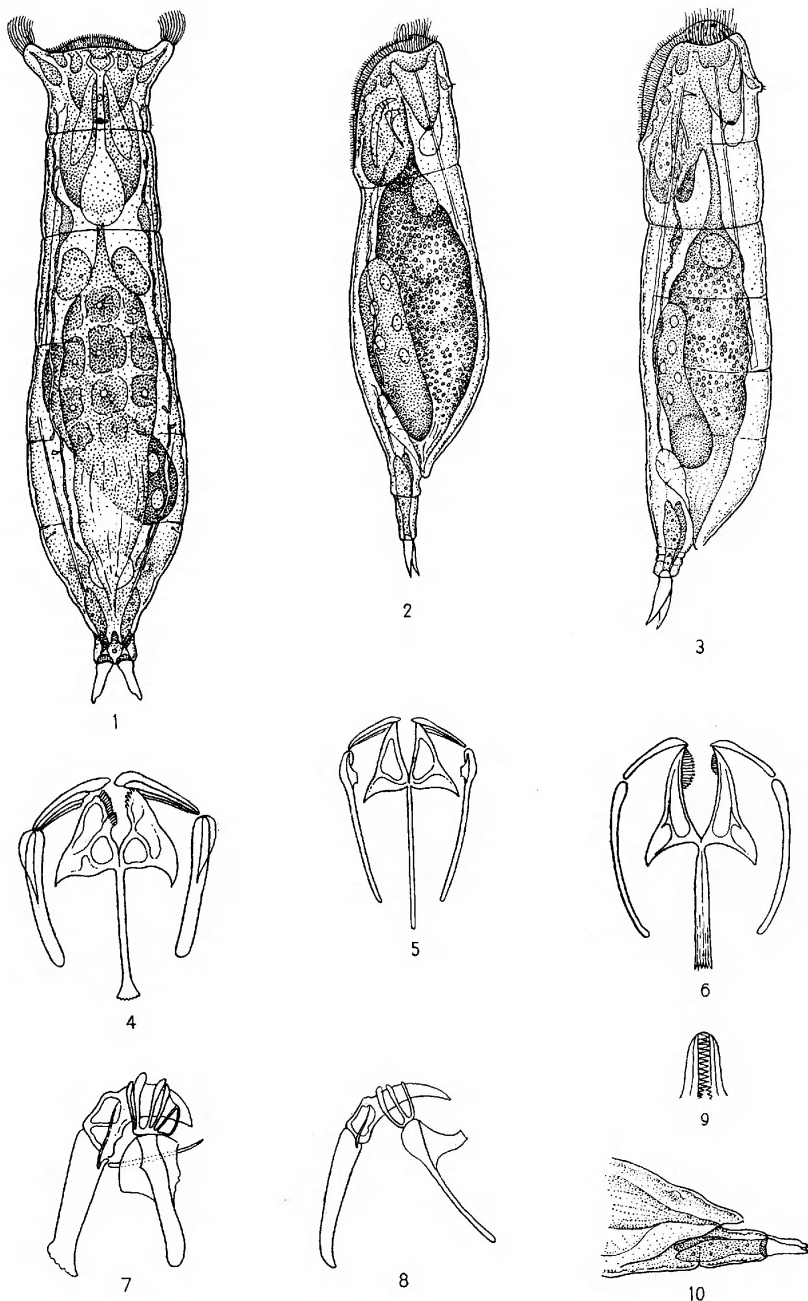


Fig. 1. *Notommata parvida*, dorsal view.
 Fig. 2. *Notommata stitista*, lateral view.
 Fig. 3. *Eothinia carogaensis*, lateral view.
 Fig. 4. *Notommata parvida*, trophi, ventral view.
 Fig. 5. *Notommata stitista*, trophi, ventral view.
 Fig. 6. *Eothinia carogaensis*, trophi, ventral view.
 Fig. 7. *Notommata parvida*, trophi, lateral view.
 Fig. 8. *Notommata stitista*, trophi, lateral view.
 Fig. 9. *Eothinia carogaensis*, tips of rami.
 Fig. 10. *Eothinia carogaensis*, posterior portion of body, lateral view.

An inconspicuous fold marks the junction of the neck with the abdomen. The trunk is gibbous both dorsally and ventrally and tapers evenly to the foot, which is composed of two slender joints, the terminal being the longer. The toes are short, undulate and taper to very acute tips.

The antennae are normal and in the usual positions.

The buccal field of the corona is evenly ciliated and continues down the ventral side of the body for about one-fifth of its length forming, posteriorly a slight chin.

The mastax is of the virgate type and the trophi are symmetric and very slender. The fulcrum is long and tapers gradually to the posterior portion which is slightly incurved. The rami are symmetric and triangular, without denticulation on the inner margins. The unci each has three similar teeth; a prominent ventral tooth, followed dorsally by one more slender and a third, nearly rudimentary. The manubria are very slender; below the basal portion there is a prominent lamellar branch which is truncate distally.

The oesophagus is very short. The stomach and intestine are invariably crowded with chlorella and intracellular digestion appears to be in the first stage, or rudimentary. The gastric glands are small and ovate. The ovary is elongate and irregular in outline. The bladder is normal, and the foot glands are long and slender.

The retrocerebral sac is small and pyriform, and no subcerebral glands are present. The eyespot is a small lenticular body, situated at the posterior end of the ganglion.

Total length, 168 μ ; toes, 13 μ .

Notommata stitista was fairly common. It is related to *Notommata venusta* Harring and Myers, from which species it can be distinguished by the very different trophi, the toes, and the presence of chlorella with which the stomach cells of adults are crowded.

Holotype: Cat. No. 873, A. M. N. Hist.

***Eothinia carogaensis*, new species**

Figures 3, 6, 9, 10

The body is cylindric, stout and almost parallel-sided. The integument is very flexible, but the outline is quite constant.

The transverse fold, separating the neck from the abdomen is very distinct. The abdomen is of about the same depth for two-thirds of its length, from whence it tapers somewhat abruptly to the small tail. The foot is short and obscurely wrinkled. The toes are slender and short; from a narrow base they expand abruptly then diminish gradually to acute tips.

The dorsal antenna is a prominent knob-like projection, with a tuft of sensory setae emerging from the tip.

The buccal field of the corona is evenly ciliated and continues down the ventral side of the body for about one-fifth of its length. The apical area is strongly convex and unciliated. The marginal cilia are short, with the exception of two lateral arcs, which are provided with strong locomotor cilia.

The mastax is of a specialized virgate type, representing a superposition of two types (virgate and forcipate) as a secondary adaptation to a different method of feeding. The fulcrum is long and straight; it is formed of two plates joined at the

dorsal edges, so that a cross-section is V-shaped. The distal third of the triangular rami are bent abruptly toward the dorsal side and the bases are expanded into broad decurved alulae. There is a V-shaped opening just above the fulcrum which is followed, on the inner margin of the right ramus, by a fan-shaped comb of long, slender teeth; the inner margin of the left ramus is provided with a similar comb, but it is much smaller than that of the opposing ramus. The unci have but one strong tooth. The manubria are straight rods, slightly incurved in ventral view, and somewhat expanded at the base. The epipharynx is reduced to two very thin triangular plates. Two well-developed salivary glands are present, the gland on the right side of the mastax being the larger.

The oesophagus is long and slender. The gastric glands are small and round. The stomach and intestine are not distinctly marked off. The ovary is normal, and the bladder is very small. The foot glands are long and pyriform.

The ganglion is of medium size. The retrocerebral organ consists of a small clear sac and two subcerebral glands, which are about one-half the length of the sac, including the duct. A round eyespot is situated at the posterior end of the ganglion, while two accessory eyespots are found on the corona near the openings of the ducts of the retrocerebral sac.

Total length, 260 μ ; toes 25 μ .

Eothinia carogaensis was quite rare. It resembles *Eothinia tryphaea* Harring and Myers and *Eothinia poitera* Myers, in the shape of the body. It is closely related to *Eothinia elongata* (Ehrenberg), through the trophi. The general shape of the body, the denticulation of the rami; the corona, one-half of which is prone, together with the wrinkled foot, readily distinguish it from that species.

Type: Cat. No. 878, A. M. N. Hist.

***Monommata viridis*, new species**

Figures 12, 19, 21

The body is cylindric and slender. The integument is very flexible and the outline changes constantly with the contortions of the individual.

The head is not set off from the abdomen by an apparent skin fold or constriction, the entire body being nearly parallel-sided. The stomach ends, anteriorly, in four blind sacs and is pigmented green by the presence of chlorella, digestion being intracellular. The foot is stout and obscurely two-jointed. The toes are extremely long and unequal, the left being about three-fourths the length of the right.

The dorsal antenna is a double papillose projection from the tips of which emerge sensory setae. The lateral antennae are normal.

The mastax is of modified virgate type. The fulcrum is relatively short, curved and tapering. The rami are slender and lyrate; they are bent dorsally near mid-length at an approximate right angle; the dorsal portion has a small tooth on the inner margin near the base. The unci are reduced to excessively thin lamellar plates, the anterior margins of which rest on the lateral edges of the rami; the posterior edges are somewhat thickened, resembling slightly clubbed teeth. The mallei are very small; the central branch of the manubrium is stout and bent abruptly toward the dorsal side; there is a curved digitiform process near mid-length that also curves dorsally.

The retrocerebral sac is round, clear and ductless. A small eyespot is situated at the posterior end of the ganglion.

Total length, 382 μ ; body, 166 μ ; right toe, 216 μ .

Monommata viridis was common. It has also been collected in Atlantic County, New Jersey, where it is found in the littoral region among *Sphagnum* in bodies of acid water. It bears a general resemblance to the other species of the genus, but differs from all of them in the combined characters of the round, clear, ductless retrocerebral sac; the prominent dorsal antenna, the absence of gastric glands and the method of digestion, together with the differences in the trophi.

Paratype: Cat. No. 604, A. M. N. Hist.

Monommata aequalis (Ehrenberg)

Figures 11, 15, 18

Notommata aequalis EHRENBURG, 1832, Abh. Akad. Wiss. Berlin, (for 1831), p. 134; 1838, 'Infusionsthierchen,' p. 432, Pl. 53, fig. 3.

Monommata aequalis EYFERTH, 1878, Einf. Lebensf., p. 84; 1885, p. 109.

Monommata aequalis VOIGHT, 1912, 'Susswasserfauna Deutschlands,' pt. 14, p. 104, Fig. 194.

Furcularia aequalis HUDSON AND GOSSE, 1886, 'Rotifers,' II, p. 46, Pl. 104, Fig. 194.

The body of this species is slender, elongate, fusiform and very transparent. The integument is flexible but the outline of the body is quite constant.

The head segment is relatively long and broad. It is separated from the abdomen by several indefinite depressions and elevations. The abdomen falls away gradually to the minute tail. The foot is short, stout and obscurely two-jointed. The toes are long and equal in length.

The dorsal antenna is a small setigerous papilla in the normal position; the lateral antennae are situated on the posterior fourth of the body.

The corona is slightly oblique and consists of a marginal wreath of cilia with lateral auricle-like tufts of longer cilia adapted for locomotion; the apical area is unciliated and the buccal field is evenly clothed with short, close-set cilia.

The mastax, while highly specialized, is of a simple virgate type. The fulcrum is long and slender; its base is expanded and crutch-like. The rami are very slender and lyrate, and lie nearly at a right angle to the fulcrum. The mallei are relatively small; the median branch of the manubrium is stout and nearly straight; the dorsal branch is sub-square and its posterior margin is produced in the form of a projecting lobe; the ventral branch is oval in shape.

The oesophagus is fairly long. The gastric glands are small and oval. The stomach and intestine are not separated by a marked constriction. The ovary is large, and the bladder is normal. The foot glands are stout and pyriform.

The ganglion is long and saccate. The black retrocerebral sac is round and ductless; it encloses the small eyespot, which is situated at the posterior end of the ganglion.

Total length, 227 μ ; length of body, 110 μ ; toes, 117 μ .

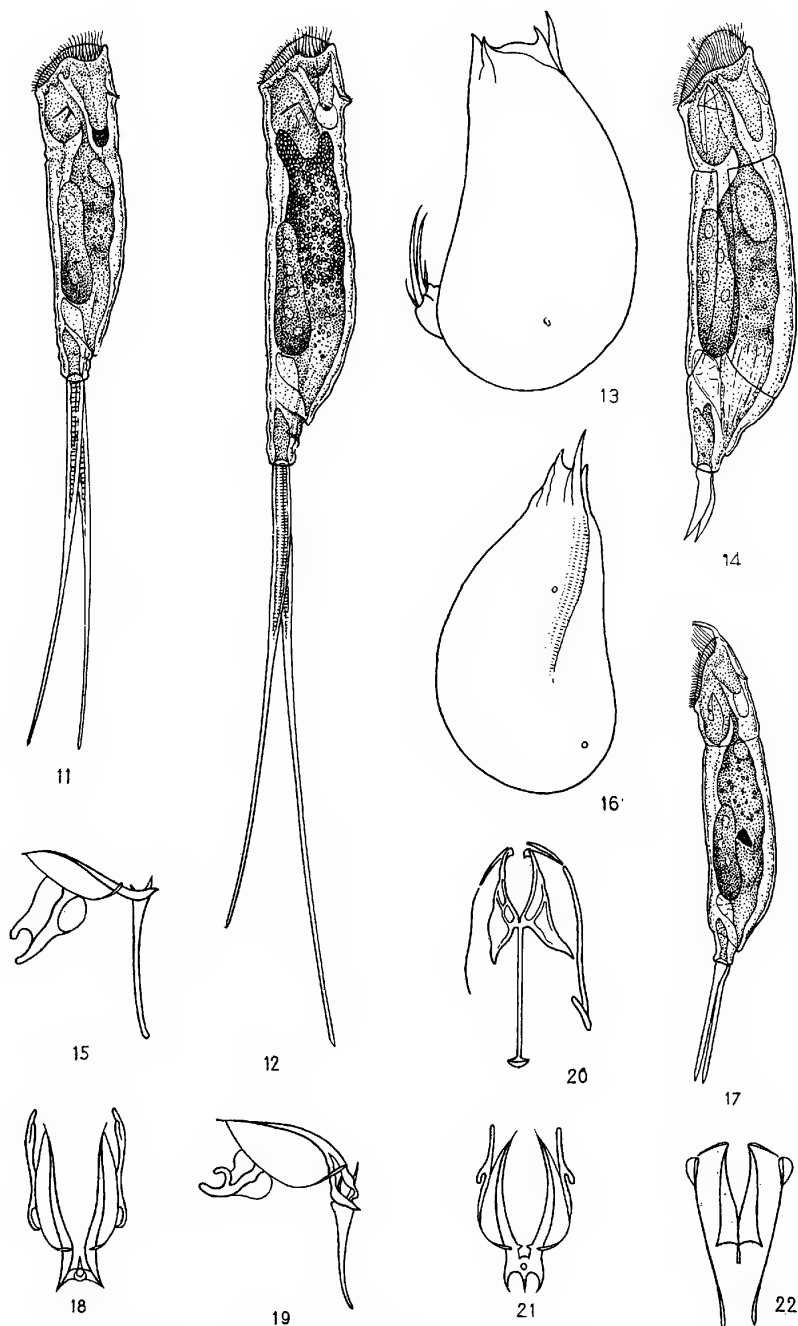


Fig. 11. *Monommata aequalis*, lateral view.
 Fig. 12. *Monommata viridis*, lateral view.
 Fig. 13. *Trichocerca rotundata*, lorica, lateral view.
 Fig. 14. *Cephalodella celeris*, lateral view.
 Fig. 15. *Monommata aequalis*, trophi, lateral view.
 Fig. 16. *Trichocerca rotundata*, lorica, dorsal view.
 Fig. 17. *Dicranophorus minutes*, lateral view.
 Fig. 18. *Monommata aequalis*, trophi, frontal view.
 Fig. 19. *Monommata viridis*, trophi, lateral view.
 Fig. 20. *Trichocerca rotundata*, trophi, ventral view.
 Fig. 21. *Monommata viridis*, trophi, frontal view.
 Fig. 22. *Dicranophorus minutes*, trophi, ventral view.

Monommata aequalis was common. It seems to be common in weedy ponds almost everywhere, and has probably been overlooked on account of its rather strong superficial resemblance to *Monommata longiseta* (Müller). It is distinguished from that species by the absence of subcerebral glands and the markedly different trophi. The fact of the toes being equal in length does not seem to be of major importance, as the toes of other species of the genus are often nearly equal. It bears a certain resemblance to *Monommata caudata* Myers, the trophi of which species appear to be quite similar, but the presence of longitudinal, converging body striations, the prominent tail and the consistently unequal toes distinguish that from our species.

Cephalodella celeris, new species

Figure 14

The body is elongate and nearly cylindric. The abdomen gradually increases in depth posteriorly, then falls away rather abruptly to the small tail. The longitudinal sulci are distinct and slightly flaring, distally. The foot is small, and the toes are stout and decurved; the basal portion is slightly expanded, then suddenly constricted and again expanded, from whence they diminish gradually to acute tips. The foot glands are stout and pyriform.

The corona is oblique and convex, without protruding lips.

The mastax is of the modified virgate type peculiar to the genus. The manubria are slender, rod-like and curve slightly dorsally. The gastric glands are very large and oval.

The ganglion is long and saccate. Eyespot and retrocerebral sac are absent. Total length, 135 μ ; toes, 20 μ .

Cephalodella celeris was quite common. It is extremely rapid in all its movements, and resembles several of the eyeless species of the genus superficially; but it can be easily recognized by the peculiarly shaped toes, together with its very rapid method of locomotion.

Paratype: Cat. No. 700, A. M. N. Hist.

Subfamily **Trichocercinae**

Trichocerca rotundata, new species

Figures 13, 16, 20

The body is short, very stout and round posteriorly. The integument is quite flexible and very transparent. The head sheath is indistinct, and has two prominent anterior mucrones situated on the dorsal side, the right mucro being the longer. There is also a less prominent mucro situated near the ventral side, which is only apparent in fully contracted individuals. A low dorsal ridge arises at the base of the longer dorsal mucro and extends down the body for about two-thirds of its length. The foot is ventrally placed and is removed a distance of at least one-sixth of the entire length of the body from the posterior limit of the lorica. The toes are approximately equal in length and directed forward.

The corona is normal and there is a small digitiform process situated on the apical area.

The antennae are in the usual positions, the two laterals emerging from minute tubules.

The mastax is of the modified virgate type peculiar to the genus, and the trophi are asymmetric. The fulcrum is a long, lamellar plate which is expanded posteriorly. The rami are triangular and the alulae are prominent, the left being more slender than the right. The right uncus is provided with two very slender, bacillar teeth; the left uncus is also provided with two teeth, but they are much stouter than the opposing teeth of the right uncus. The right manubrium is atrophied and bacillar, the left being much more robust, and the distal end is strongly crutched.

The stomach, in adult individuals, is invariably pigmented a bright green, due to the presence of chlorella among the cells of the stomach wall, and digestion is intracellular. There are no gastric glands; the anterior portion of the stomach is produced into two blind sacs crowded with chlorella. The remainder of the anatomy is normal.

Total length, 135 μ ; toes, 35 μ .

Trichocerca rotundata was common among *Sphagnum* wherever found. It is evidently a well-distributed acid water species, and has also been found in Atlantic County, New Jersey; Mount Desert Island, Maine; Vilas County, Wisconsin, and in bodies of water on the Pocono plateau, Pennsylvania.

This species resembles *Trichocerca porcellus* (Gosse), in a number of particulars, and it is possible it may have been mistaken for that species during the past. However, the body is much stouter and rounded posteriorly; the foot is not terminal, but situated on the ventral side, being removed a certain distance from the posterior limit of the lorica; there are no gastric glands and digestion is intracellular. Adult individuals can be recognized at once on account of their bright green color.

Paratype: Cat. No. 446, A. M. N. Hist.

Family Dicranophoridae

Dicranophorus minutes, new species

Figures 17, 22

The body of this small species is elongate, cylindric and nearly parallel-sided. The integument is very flexible and the outline of the body varies considerably with the state of contraction of the individual.

The head is separated from the abdomen by a well-marked neck fold.

The antennae are very minute and in the normal positions.

The corona is nearly ventral; it is provided with prominent lateral tufts of long locolotor cilia, and the rostrum is large, decurved and rounded anteriorly.

The abdomen tapers rather abruptly to the minute tail. The foot is short, and the toes are very long, parallel-sided and suddenly enlarged, dorsally, near the base.

The mastax is of the forcipate type, and the trophi are very slender. The rami

are triangular and without inner denticulation; the unci each has a single, rod-like tooth. The manubria are very long, slender and slightly expanded at both ends.

A clear retrocerebral sac is attached to the posterior end of the ganglion. There are no eyespots.

Total length, 98μ ; toes, 32μ .

Dicranophorus minutes was quite common. It is widely distributed among wet marginal and submerged *Sphagnum* in acid ponds and ditches, but is never numerous. It is readily distinguished from the other small species of the genus by the absence of eyespots, the delicate trophi and the long, straight toes expanded at the base.

Paratype: Cat. No. 872, A. M. N. Hist.

REMARKS ON DISTRIBUTION

Individual stragglers belonging to the alkaline water fauna are occasionally found in acid water associations and vice versa. Rotifers, transferred from one association to the other, do not seem to be affected by the change in hydrogen-ion concentration, nor are the eggs of duration, which hatch out producing amictic females. The resulting eggs of these parthenogenetic females do not hatch, however, and the line of succession is thereby definitely ended.

The following genera may be designated as typical of alkaline water: *Brachionus*, *Eosphora*, *Notholca*, *Sinantherina* and *Lacinularia*. There are also numerous species, within certain genera, that belong definitely to either the acid or alkaline fauna, and the presence or absence of these is a reliable index as to the hardness or softness of a certain body of water.

During a period of over twenty years collecting among the various bodies of acid water in Atlantic County, New Jersey, only four stragglers of the genus *Brachionus* have been recorded: *Brachionus capsuliflorus* Pallas, three times, and *Platytias* (*Brachionus*) *patulus* (Müller), once. No specimens of any other of the above genera have been recorded. Many species of *Cephalodella*, *Lepadella*, *Lecane* and *Trichocerca* are acid water rotifers. *Asplanchnopus multiceps* (Schränk) is an alkaline water rotifer, while its relative *Asplanchnopus dahlgreni* Myers is an acid water species. *Eosphora thoa* Haring and Myers, an acid water rotifer, is not uncommon in Atlantic County, while its near relative, *Eosphora anthadis* Haring and Myers, an alkaline water species, has never been recorded from there.

Carnegie Lake, Princeton, New Jersey, a body of alkaline water, is only about fifty miles from the Pine-barrens of New Jersey, the waters of which are all acid. There are no physical barriers intervening, the

country being quite flat. *Brachionus* is the predominating genus in Carnegie Lake, virtually at all times. *Asplanchna* is also abundant. No acid water rotifers occur in that lake and no alkaline rotifers occur in the Pine-barrens.

Just north of Fonda, New York, there is a series of large permanent pools, several of which are over an acre in area. They lie between state automobile route 5 and the embankment of the New York Central Railroad. Several of these pools are directly connected with the Mohawk River by underpasses, and the waters are all alkaline. The predominating species are *Brachionus*, *Keratella* and *Notholca*. Garoga Creek, the outlet of Caroga Lake, empties into the Mohawk River not far from these pools, and it is reasonable to assume that a certain portion of the waters mingle. Yet, no acid water rotifers have been found in the pools, and, as seen from the faunal list, no alkaline water rotifers were found in Caroga Lake.

During the course of time, the majority of rotifers, known as trans-cursion or cosmopolitan species, have become tolerant to reasonable changes in hydrogen-ion. Such rotifers are distributed throughout the world wherever conditions of existence permit, and are found in either acid or alkaline water associations. The great majority of rotifers belong to this fauna.

Proales rheinardti (Ehrenberg) is found among moss in the clearest of mountain springs; it is also found among *Fucus* in the sheltered parts of bays and inlets of the ocean, the waters of which are highly alkaline. If, as is supposed, the fresh water is the original home of the rotifers, the element in which the group originated, then it is reasonable to suppose that the brackish and salt water species have emigrated from fresh water and, in doing so, have become tolerant of the change in hydrogen-ion and also specific gravity. A number of rotifers have become adapted to this change by structural modifications. *Encentrum villosum* Harring and Myers, a salt-water species, is found among algae in salt pools near the outlet of Great Egg Harbor River, New Jersey. It is clearly derived from its close relative *Encentrum felis* (Müller), which is found among algae in the fresh water of the same river about twenty miles from the outlet. This seems to be a case of immigration. *Proales rheinardti* appears to have undergone the change without any anatomical modifications, as far as can be seen.

If such changes in distribution can be made during the course of time, it is reasonable to suppose the acid water rotifers are gradually becoming tolerant of alkaline water associations, which are far more

abundant throughout the world, and will eventually become transeursion species.

LITERATURE CITED

EDMONDSON, W. T. 1935. 'Some Rotatoria from Arizona.' Trans. Amer. Micr. Soc., LIV, pp. 304-305.

CORRECTIONS

'Psammobiotic Rotifers of Lenape and Union Lakes, New Jersey.' Amer. Mus. Novit., No. 830, March, 1936. The genus *Dicranella* being preoccupied (*Crustacea: Ostracoda*, E. Ulrich. 1894), genus **Pedipartia** is hereby substituted.

On pp. 9 and 20, for *Aspelta egregium*, read *Aspelta egregia*.

On p. 14, for *Asplanchna harricki*, read *Asplanchna herrickii*.

